Draft Summary

Meeting Summary
National Earthquake Prediction Evaluation Council (NEPEC)
November 4-5, 2013 at USGS, Menlo Park, California

Attending:

NEPEC Members:
Terry Tullis, Brown University (Chair)
William Leith, USGS, Reston (Co-chair, Nov. 5 only)
Ramon Arrowsmith, ASU (not attending)
Roland Bürgmann, UC Berkeley (Nov. 5 only)
William Ellsworth, USGS, Menlo Park
Susan Hough, USGS, Pasadena
David Jackson, UC Los Angeles
Andrew Michael, USGS, Menlo Park
Evelyn Roeloffs, USGS, Vancouver, WA
Allan Rubin, Princeton University
Bruce Shaw, Columbia University
John Vidale, University of Washington

USGS Hosts and Staff:
Tom Brocher, Earthquake Science Center (ESC) Director
Keith Knudsen, ESC Associate Director
Michael Blanpied, USGS (NEPEC Executive Secretary)
Joyce Costello, USGS, Reston (not attending)

Guests:
Nicholas Beeler, USGS, Menlo Park
Joe Fletcher, USGS, Menlo Park
Steve Hickman, USGS, Menlo Park
Lucile Jones, USGS, Pasadena
John Langbein, USGS, Menlo Park
Jessica Murray, USGS, Menlo Park
Bob Nadeau, University of California, Berkeley
David Shelly, USGS, Menlo Park

Day 1 – Updates on previous topics of NEPEC interest:

On the first day of the meeting, the NEPEC was provided with briefings on several topics that had been discussed at previous meetings. Following the usual round of introductions and

reminder of FACA meeting guidelines, Mike Blanpied presented a summary of the fiscal status and outlook of the USGS Earthquake Hazards Program, to accompany a written summary provided earlier to the Council by Program Coordinator Bill Leith, who could not attend the first day of the meeting. The finances of the program are challenging because funding is constrained by the government-wide sequestration, and because budget levels are extremely uncertain until very far into the fiscal year.

Andy Michael briefed the Council on research advances at USGS in characterizing earthquake clustering. The extended aftershock sequence under and near Christchurch is providing valuable data on earthquake clustering behavior, and valuable insights into communication and social science issues relating to public warning statements, including what information tends to build or reduce public trust in the scientists providing forecast information. Lucy Jones summarized work with social scientists and staff at the Art College of Design in developing strategies for effective warning messaging.

Bill Ellsworth, who chairs the Scientific Review Panel for the Uniform California Earthquake Rupture Forecast version 3 (UCERF3) summarized progress toward completion of the time-independent earthquake forecast model, and looked ahead to work needed to complete a time-dependent version in the coming year. In discussion, John Vidale asked about the treatment of off-shore faults, noting that some tsunamigenic faults are not well characterized, and noting that faults very near shore can have strong influence on hazard.

Bill also described USGS activities in the study of induced seismicity, particularly related to deep injection of waste fluids from oil and gas fracking operations. Evelyn Roeloffs, who works in the USGS induced seismicity group, noted that the NEPEC might have a role in helping resolve communication issues that were serving to pit scientists against industry in what messages are given to the public about induced earthquake hazards and their causes.

Day 2 – Review of USGS research at Parkfield, California:

The NEPEC was asked to examine USGS activities and investments related to research in the area around Parkfield, California, near the southern end of the San Andreas creeping section. They were given a number of briefings on current geodetic and weak and strong motion seismic instrumentation, on recent research findings and ties to the USGS mission to assess hazard and reduce risk, on strain and creep observations, deep seismic tremor and fault creep, and status of the San Andreas Fault Observatory at Depth, a major scientific borehole funded by NSF and USGS that intersects the San Andreas fault at 2.5 km depth. Bob Nadeau and Roland Burgmann also summarized the history and status of the High Resolution Seismic Network (HRSN), a high-quality borehole seismic network around Parkfield.

Although USGS has a long history of substantial research investment in the Parkfield region, current investments are small. USGS annual costs include about $75,000 for maintenance, leases and operation of deformation monitoring equipment, $8,500 to maintain a strong motion array, about $400,000 for work related to SAFOD (most of that being salary support for research on fault core), about $80,000 provided to UC Berkeley for maintenance of the HRSN, and occasional external grants (zero to two per year) for Parkfield-related research.

Research and monitoring investments have yielded a rich crop of important research results, highlighted by the capturing of the 2004 M6 earthquake, but also far beyond that. Participants in the meeting identified a large number of extant research problems that may be borne upon by Parkfield observations. These include the goal of capturing an entire seismic cycle with high-quality seismic and geodetic instruments; observing post-seismic and inter-seismic processes, examining the behavior of deep seismic tremor in the fault zone and its relationship to various influences such as tides, fault creep; passage of seismic waves, and so forth; and addressing the sources of variability and uncertainty in ground motion, with implications for the refinement of ground motion prediction equations (GMPE's) that bear heavily on probabilistic seismic hazard and risk evaluation. The HRSN was identified a number of times as an important observational resource. And it was noted that USGS activities at Parkfield will depend strongly on decisions by the National Science Foundation on whether and how to maintain the SAFOD facility and how USGS research and facility management fits into that picture.

The USGS did not request a formal report from the NEPEC regarding Parkfield, but may do so at a future time.

The meeting concluded with a discussion of future NEPEC membership, with several names being mentioned as potential members.